

ERGOTEC ASSOCIATION, INC.

Human Engineering Non-Profit

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RECEIVED

Mr. William Caton
Secretary
Federal Communications Commission
1919 M Street, NW
Washington, DC 20433

August 22, 1997

AUG 22 1997

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

**PETITION TO DENY REQUEST FOR EXTENSION OF COMPLIANCE DATE
AND
REPLY TO COMMENTS AND REPLY FILED BY
AMERITECH AND PCIA
IN HEALTH AND SAFETY DOCKET NO. 93-62**

Dear Mr. Caton:

Primarily, kindly accept this document as a **PETITION** opposing the *Emergency Request* of the Personal Communications Industry Association (PCIA) filed 8 August 1997, and Ameritech's *Request* (15 August 1997) to *extend the health and safety compliance deadline by one (1) year beyond the present mandate of 1 September 1997*. **Secondly**, please also register this instrument as a **REPLY** to the *Comments and Reply* filed by Ameritech (8 and 23 October 1996; 27 March 1997).

PETITION

Ergotec implores the Commissioners of the Federal Communications Commission (FCC) to **DENY** the *Request* of PCIA and Ameritech to *Defer the Transition Date for compliance* with the power density limit that was lowered from 10mW/cm² to 1mW/cm² for the general population. The new guidelines, prescribed by the National Council for Radiation Protection (NCRP), and recommended by the health and safety Interagency Group (EPA, FDA, OSHA, NIOSH), must be immediately instituted and enforced. The reason is twofold: (1) In its *Report and Order* (FCC 96-326) released 1 August 1996 the Commission states, "...the Notice in this proceeding was first issued in 1993.... Telecommunications Act of 1996 was enacted early in February [1996]. Therefore, industry has had ample time to prepare to meet the deadline for implementation of the new guidelines." *See VI. Ordering Clauses* at page 62. (2) Industry has made no demonstrable effort to reduce the power density of microwave antennas, nor proposed a plan to do so. Rather, Ameritech and PCIA asked FCC to do its work and, for instance, "determine who is liable when carriers co-locate on towers and antenna emissions exceed the established 1mW/cm² limit."

FCC is a licensing agency. It is the responsibility of industry to provide safe and wisely engineered products. Wireless communications is a **luxury, not a necessity!** Since conventional telephones are readily available, calls will always get through! Therefore, and in any case, mobile communications is not superior over human health and safety.

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Four years elapsed since FCC issued the *Public Notice* of its intention to adopt new health and safety guidelines with respect to telecommunications siting. Instead of finding ways to safeguard the population, industry has busied itself proliferating electronic products for which they cannot vouch safety. Since history generally repeats, industry is not apt to comply with any power density guidelines now or in future. In fact, wireless telecom products do not satisfy the old exposure limit (10mW/cm²). How can industry comply with the new limit (1mW/cm²)?

It is in the best interest of the general public, as NCRP and the Interagency Group intended, that FCC immediately impose the new exposure guidelines (1mW/cm²) and enforce compliance at 1mW/cm² as of 1 September 1997. PCIA has had four years to prepare its membership to comply with the new guidelines. Therefore, its so-called emergency is not justified. Citizens should not be punished for industry's negligence. Please **DENY the REQUEST** for an extension of the compliance deadline entered by PCIA, as well as that of Ameritech.

At a meeting with Ms. Rosalind Allen (22 July 1997), she indicated that the "September 1 compliance deadline will probably slip into 1998." (See Ergotec's *Ex Parte Communications*, 22 July 1997 in Docket 93-62.) Such a statement can only be construed as privileged information derived from *ex parte* communications that were not filed in Docket 93-62. Since the Commission stated over one year ago that "the compliance deadline would *not be changed*," Ergotec petitions FCC, on behalf of American citizens, to DENY the request of PCIA and Ameritech and any other entity that has or may request an extension of the health and safety compliance deadline.

REPLY

On 3 September 1996, Ergotec filed a *Petition for Reconsideration* to adopt the NCRP health and safety guidelines in lieu of ANSI, and make them effective immediately. Three documents were attached to our letter attesting to absolute biological effects from electromagnetic radiation (EMR) spewing from microwave antennas. The documents were: (1) Research performed by scientists in the former Soviet Union on the *Neural Effects of Microwaves*; (2) *Effects of microwave radiation* impinging on employees at the US Embassy in Moscow; (3) *Assessment on Health Hazard and Standard Promulgation in China* by Chiang Huai of the Microwave Institute (Chekiang Medical College; Hangchow, China), which was prepared for NATO. No one challenged the documents or acknowledged they were filed, although Ameritech sent Ergotec a copy of its comments. In fact, the Commission's *Wireless Bureau* excluded the Petition of Ergotec from its web page under *Petitions for Reconsideration - Summaries*. In its filing of 8 October 1996, Ameritech refuted the submission of the Ad-Hoc Association. This carrier typed our name, but bypassed Ergotec's filing. In its comments of 27 March 1997, Ameritech debated statements of the Ad-Hoc Association and Cellular Task Force, but excluded those of Ergotec. Since our **Petition for Reconsideration** has been totally ignored by industry and the Commission, Ergotec wants to know when it will be addressed. When will FCC acknowledge the hazards of microwave radiation, and take steps to protect the general public? When?

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Ergotec objects to *comments* and the *reply* filed by Ameritech and proffers the following response to certain remarks in its filings.

— **Ameritech:** Wireless industry serves a safety function.

Ergotec: With respect to 911? Cellular 911 calls are usually routed to State Police, whose precinct is often outside the area where the emergency call originated. By the time emergency crews reach the caller, it is often too late.

— **Ameritech:** Preemption of state and local government radio frequency (RF) rules is vital, and should be extended to include federal imposed liability.

Ergotec: When, in the history of a *democracy*, has the federal government *ordered* citizens to accept and enjoy services they reject and fear? If citizens wanted PCS and cellular phones and digital television they would welcome risk, and beg industry to plant 300 to 2000-foot tall digital towers on their property! But this is not so. Citizens struggle to avert the installation of such towers.

FDA confronted the tobacco industry for enticing citizens to indulge in tobacco products, which ruined many people. But now the Federal Government has assumed the role of the tobacco industry. The Government is forcing citizens to harbor and use high-tech electronic products, even though people sense danger and scientists find the technology harmful. Federal officials think technology is more valuable than life. If the Federal Government preempts *all local and state laws* citizens will be defenseless, and surely perish in an intense sea of radiation. Neither people, animals, nor the environment can survive industry's electromagnetic creation.

Industry maintains that health and safety laws are an *unnecessary burden* to the advancement of technology. Be assured that those overexposed to electromagnetic radiation (EMR) will bear the burden for the gluttony of industry and the government. Insurance companies will not have sufficient money to compensate the vast population that has and will become electrosensitive (ES) from overexposure to high-tech EMR. Already the Environmental Protection Administration reports a high and rapidly multiplying number of people suffering ES.

In FCC 96-326 (at page 61 and 63), the Commission *denied the petitions of Hammett and Edison and the Electromagnetic Energy Association (EEA), as well as comments from several parties requesting a broad-based preemption policy to cover all transmitting sources.*" Therefore, in abiding by its policy, the Commission **must** also **deny** Ameritech's request and that of any other company seeking to overthrow state and local laws to market dangerous products.

— **Ameritech:** Industry has limited resources with which to come into compliance.

Ergotec: If industry lacks money to provide a safe product, it should cease to operate.

— **Ameritech:** There is no conclusive evidence of [biological] harm. Industry wants compliance at 1mW/cm2 to start after FCC's OET 65 document is published.

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Ergotec: Sufficient evidence exists that EMR is harmful. But governments only want to know about the attributes of technology as recanted by industry. (See the documents Ergotec filed on 3 September 1997, and those attached hereto which articulate the hazards of EMR.) The tobacco industry suppressed the hazards of their products. They are now paying for the deception. Will the high-tech industry fall down the same road? FCC 96-326 specifies what industry must do to comply with the new standard. OET 65 will merely be an enhanced version of FCC 96-326. Industry does not require a document to implement compliance. It needs a solid plan on the method it will employ to comply with the NCRP health and safety guidelines.

— **Ameritech:** This carrier has a substantial number of antennas on rooftops, making compliance with 5mW/cm² [workers] and 1mW/cm² [population] guidelines difficult.

Ergotec: If the carrier cannot comply with 5mW/cm² exposures to workers, or 1mW/cm² to the population, it should refrain from installing antennas nationwide. Industry's products must not abrogate the health and safety of consumers.

— **Ameritech:** Technicians cannot monitor sites for compliance because such individuals have no way of knowing what antennas are on the air, site particulars, and technical parameters for each station.

Ergotec: Broadcasters established a policy whereby stations stop operating when technicians work on antennas atop towers. But the telecom industry fails to turn off antennas, so that microwaves cook technicians while they work. OSHA was concerned about such exposure to workers. But evidently OSHA did not care enough to order that antennas be deactivated during repairs.

Note: The power density compliance chart (below) was taken from FCC 96-326 (page 93). The government says that because individuals *know* they are working with radiation, microwave technicians are allowed to be exposed to and absorb more energy (up to 5mW/cm²) in 6-minute intervals than the public whose exposure is always limited to 1mW/cm². But do workers actually stay atop towers for only 6 minutes at a time? If they are 6 minutes on the tower, and 6 minutes off the tower, how much time do they actually spend at the site before they complete repairs? For instance, there are 10 six-minute intervals in one hour. This means a worker will actually be on the tower 30 minutes, and off 30 minutes (6 minutes x 5 times on tower = 30 minutes of intense exposure within one hour). How long will it take to get the job done; 6 minutes or 6 days? During annual employment how much radiation, and at what frequency and power, will workers actually absorb if they work 220 days per year for at least 7 hours per day?

In the population, how many people remain in the shadow of a tower, especially those living 20 feet from towers, for only 30-minute intervals? Do people protect themselves by staying in their home 30 minutes, and then alternately burrowing into the ground for 30 minutes?

Notice that workers are approved to receive 5 times as much radiation, in a shorter timeframe, than the general population. That is, for every 6-minute timeframe workers are immersed in 5mW/cm² power density at close range. Whereas, the population receives 1mW/cm² in 30-

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minute parcels. However, since antenna emissions are continuous and energy absorption is steady, the exposure is nearly equal for workers (short time in intense radiation) and the population (long time in weakened radiation). Due to their proximity from the source, workers will exhibit injury before the general population.

Respectfully,


Bert Dumpe - CEO

cc: Commissioners; Ameritech, PCIA, Petition for Recon participants (w/o attachments)
Mr. Robert Cleveland, Interagency Group, ITS, Distribution

Attachments

Federal Communications Commission

FCC 96-326

Table 1. Limits for Maximum Permissible Exposure (MPE)

(A) Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f ²)*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6

f = frequency in MHz

* = Plane-wave equivalent power density

(B) Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

f = frequency in MHz

May 12, 1997

Background Information:
Australian Study of Cell Phone-Like Radiation and Transgenic Mice

A study in the May issue of the journal *Radiation Research* reported an increased incidence of lymphoma (cancer of the lymph glands) in mice exposed to the type of radiofrequency radiation (RFR) emitted by digital cellular phones used in Australia. Because the type of mice used in the study are unusually susceptible to lymphoma, these results may not be applicable to cellular phone users. The following may be used to answer questions.

The goal of the study was to determine whether long-term exposure to RFR similar to that used in digital phones in Australia would increase the incidence of lymphoma in a strain of mice which have been genetically altered to be moderately predisposed to develop this type of cancer. In the study, 101 mice carrying this cancer-causing gene were exposed to the RFR for 30 minutes twice a day for up to 18 months. The RFR was generated by an antenna adjacent to the cages, with the mice allowed to move around during the period of exposure. A control group of 100 mice with the same gene were housed and treated in the same way, but not exposed to the RFR. In the mice exposed to the RFR, the incidence of cancer of the lymphoid system increased from 22% to 43%.¹

Although this study suggests that radiation emissions from cellular phones can have biological effects, the results of a single experiment in mice should not be interpreted as conclusive evidence that these emissions cause cancer in humans, for several reasons.

First, the results of any single experiment should be confirmed by repetition in other laboratories.

Second, the mice were exposed to RFR under conditions that differed from the exposure humans receive from cellular phones. The animals received a moderate radiation dose throughout their entire bodies.

Third, the mice used in the study were genetically engineered to be more susceptible to a particular type of cancer, lymphoma. The cancer-causing gene present in

¹ The mice were exposed to plane-wave fields of 900 MHz with a pulse repetition frequency of 217 Hz and a pulse width of 0.6 ms. Incident power densities were 2.6-13 W/cm² and specific absorption rates were 0.008-4.2 W/kg, averaging 0.13-1.4 W/kg.

the mice does not normally occur in humans, and the implications for the possible development of cancer in humans would need to be explored further.

Finally, the type of RFR used in the experiment has the same frequency and modulation emitted by digital cellular phones used in Australia. Most cellular phones used in the US are analog phones; the digital phones used in the U.S. have a somewhat different modulation than those used in this study.

The FDA believes that the available scientific information does not indicate that people should stop using their cellular phones. If people are concerned about exposure to the RFR emitted by these products, they can reduce their exposure by keeping calls brief and limiting their calls to only those that cannot wait until a conventional phone is available. Since it is the phones antenna that emits the radiation, people can also switch to a cellular phone in which the antenna is located away from the body, such as in a briefcase or attached to a vehicle.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 6
1445 ROSS AVENUE
DALLAS, TEXAS 75202-2733

November 25, 1996

Honorable Phil Gramm
United States Senator
2323 Bryan Street, #1500
Dallas, TX 75201

Dear Senator Gramm:

Thank you for your letter of November 5, 1996, in behalf of your constituents, Mr. [REDACTED] and [REDACTED] of [REDACTED] Texas. Mr. and Ms. [REDACTED] believe that members of their family and others are suffering from various symptoms caused by exposure to radiation from cellular telephone base stations which utilize the new digital technology for signal modulation.

I have enclosed a fact sheet with more information on this issue. To summarize, there is insufficient information available at present to enable the Environmental Protection Agency to advise you on any electrosensitive effects which may be associated with exposure to radiation from digital cellular base stations. At least one study is underway (in Sweden), and others are likely to follow, particularly if complaints of electrosensitivity continue to increase. Cellular telephone base stations emit radiation levels which fall below the guidelines recently promulgated by the Federal Communications Commission.

I hope you find this information helpful in responding to your constituents. If I can be of further assistance, please contact me.

Sincerely yours,

////// signed by "Carroll" for
the Regional Administrator ////

Jane N. Saginaw
Regional Administrator

Enclosure

Fact Sheet
November 1996

Electrosensitivity and Digital Cellular Base Stations

The Environmental Protection Agency (EPA) has for many years received similar complaints from relatively few individuals living in the general vicinity of air traffic control radar transmitters, which are pulsed systems similar in many respects to digital cellular telephone systems. Clicking, buzzing, hissing and knocking sounds are known effects in some individuals exposed to high intensity radar signals. However, environmental exposure to pulsed radiation from cellular telephone base stations is at a very much lower intensity than that of radar signals known to stimulate the impression of audible noises in humans.

With the advent of digital cellular telephone and paging systems, the number of complaints similar to those of [REDACTED] has increased significantly, both in the United States and world-wide. Symptoms attributed to radio frequency exposure such as nausea, headaches, dizziness, pain in the eyes, ringing of ears, screeching and sizzling sounds, and irregular heartbeat are described collectively by the term, "electrosensitivity." These symptoms are very difficult to quantify in research studies, so little information is available on electrosensitivity to radiofrequency radiation. To our knowledge, the only research program underway at present to address electrosensitivity has just begun in Sweden. Its purpose is to determine whether or not reports of electrosensitivity to radiation from digital cellular telephone and paging systems reflect a real physiological problem. Research programs sponsored by the cellular telephone industry are currently underway, but these programs primarily focus on cancer.

The World Health Organization (WHO) is in the initial stages of planning a research program to investigate health effects of exposures to low levels of radiofrequency fields. Environmental Protection Agency (EPA) staff recently received a draft report from WHO that will serve as a basis for discussion to identify the gaps in knowledge, so that research can be targeted to better assess health risks from exposure to low levels of radiofrequency radiation. EPA staff are in the process of preparing comments which will identify biological effects of pulsed radiofrequency radiation as a significant gap in knowledge which needs to be studied.

In August 1996, the Federal Communications Commission (FCC) adopted exposure guidelines recommended by the National Council on Radiation Protection and Measurements (NCRP). The NCRP is a congressionally-chartered organization of radiation experts that collect, analyze, develop, and disseminate in the public interest information and recommendations about protection against

radiation. The EPA supported the adoption of the NCRP guidelines by the FCC. The new FCC guidelines apply to all radio frequency sources which the FCC regulates, including the new digitally modulated systems. Cellular telephone base stations are known to be low power radiofrequency radiation sources, and the radiation levels in areas accessible to the public fall below the FCC guidelines.

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Environmental Protection
Agency

Las Vegas Facility
PO Box 15027
Las Vegas NV 89114

June 1978

Radiation



Population Exposure to VHF and UHF Broadcast Radiation in the United States



POPULATION EXPOSURE TO VHF AND UHF BROADCAST RADIATION IN
THE UNITED STATES

Richard A. Tell
Edwin D. Mantiply

June 1978

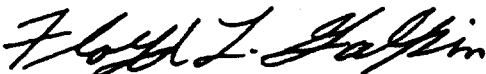
U.S. Environmental Protection Agency
Office of Radiation Programs
Electromagnetic Radiation Analysis Branch
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DISCLAIMER

This report has been reviewed by the Office of Radiation Programs, U.S. Environmental Protection Agency, and approved for publication. Mention of trade names or commercial products does not constitute endorsement or recommendation for their use.

PREFACE

The Office of Radiation Programs of the U.S. Environmental Protection Agency carries out a National program designed to evaluate population exposure to ionizing and nonionizing radiation, and to promote development of controls necessary to protect the public health and safety. This report presents the latest estimates of population exposure to radiofrequency radiation determined by this agency. Readers of this report are encouraged to inform the Office of Radiation Programs of any omissions or errors. Comments or requests for further information are also invited.


Floyd L. Galpin, Director
Environmental Analysis Division
Office of Radiation Programs

ABSTRACT

The U.S. Environmental Protection Agency has been collecting broadcast signal field intensity data for over two years to estimate population exposure to this form of nonionizing radiation. Measurement data have been obtained at 373 locations distributed throughout 12 large cities and collectively represent approximately 11,000 measurements of VHF and UHF signal field intensities. The VHF and UHF broadcast service is the main source of ambient radiofrequency exposure in the United States. A computer algorithm has been developed which uses these measurement data to estimate the broadcast exposure at some 39,000 census enumeration districts within the metropolitan boundaries of these 12 cities. The results of the computations provide information on the fraction of the population that is potentially exposed to various intensities of radiofrequency radiation. Special emphasis has been placed on determining the uncertainty inherent to the exposure estimation procedure and details are provided on these techniques. A median exposure level (that level to which half of the population is exposed greater than) of $0.005 \mu\text{W}/\text{cm}^2$ time averaged power density has been determined for the population of the 12 cities studied, the cumulative population of which represents 18 percent of the total United States population. The data also suggest that approximately 1 percent of the population studied, or about 380,000, are potentially exposed to levels greater than $1 \mu\text{W}/\text{cm}^2$, the suggested safety guide for the population in the USSR. Alternative techniques of using the measurement data to estimate population exposure are examined and future extensions of this work are discussed.

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BACKGROUND

The United States (US) Environmental Protection Agency (EPA) is presently gathering information pertinent to the development of guidance to Federal agencies within the US concerning limitations on radiofrequency (RF) and microwave (MW) exposure of the general population. This information consists of both detailed descriptions of the biological effects of RF and MW energy in experimental test animals and man, and normally encountered environmental exposure levels throughout the country. This report provides detailed information on the results of our environmental measurements program and presents our most current estimates of population exposure based on these measurement data. It is pertinent to describe the general approach used by the USEPA in collecting these data; in the first instance, numerous and widely distributed measurement points, generally selected on the basis of population distributions, located throughout many US high density metropolitan areas have been used to determine ambient exposure levels of RF and MW energy. These measurement data are then used in conjunction with a computer automated algorithm which contains census data to provide estimates of the fraction of the studied population exposed to various intensities of RF and MW radiation. Via this method, good estimates of exposure of most of the population are obtainable. In the second instance, many field intensity measurements are conducted without regard to population distributions but rather from the viewpoint of determining the maximum or highest intensities of exposure that are possible to be found in the environment. The principle purpose of this report is to provide the results of our efforts in the first instance, but to the extent that the secondly described measurement approach provides relevant exposure data, we will discuss these "specific source" types of measurements.

Previous discussions of USEPA activities in this area are available (Janes, et al., 1977a; Janes, et al., 1977b; Athey, et al., 1978). This report contains new and more extensive data and results for US cities and uses an improved propagation modeling technique for generating estimates of population exposure. Additionally, a technique is discussed which provides insight to the consideration of the accuracy with which exposure estimates are obtained.

METHOD OF MEASUREMENTS

Detailed discussions of the development of a specially instrumented mobile electromagnetic radiation analysis van used in the collection of the environmental exposure data are available elsewhere (Tell, et al., 1976a). The instrumentation approach involves spectrum analysis techniques coupled with on-line computer assisted data acquisition for purposes of recording, correcting, and processing of the acquired spectral intensity data. A series of calibrated antenna systems appropriate to the frequency bands of primary consideration are used to provide signal input to the spectrum analyzer. Appropriate account is taken for the polarization of the impinging waves in certain bands by the use of orthogonal dipolar antenna systems. The mini-computer system provides various features including signal averaging whereby fluctuating signal amplitudes are processed to obtain time-averaged values of field intensity, and the capability to retain instantaneous peak signal intensity excursions during the overall observation period. Extensive efforts resulted in our ability to specify the measurement system uncertainties as outlined in Table 1. It is noted that the mobile measurement system has been designed to principally operate in the bands assigned to domestic broadcasting within the US; this was done because of the generally higher environmental levels of RF and MW energy being the result of the broadcast service. Several changes in the mobile measurement system are currently underway which include a new super-broadband antenna system capable of a flat response over the 50-900 MHz region and a spectrum analysis system which will result in an enhanced capability for measurement of pulsed, radar field intensities.

Use of more portable instrumentation has been made in different studies of unique exposure situations, such as the main beam illumination of tall buildings and other locations not generally accessible by the mobile van system. Some of this instrumentation, the applicable studies involving its use, and discussions of accuracy limitations have been described in previous reports (Tell and Nelson, 1974a, 1974b; Tell and O'Brien, 1977; Tell, 1976; Tell, 1978).

TABLE 1. MEASUREMENT SYSTEM UNCERTAINTIES IN VHF AND UHF BROADCAST BANDS

<u>Band</u>	<u>Frequency Range (MHz)</u>	<u>RMS System Error (dB)</u>
Low VHF TV	54- 88	2.5
FM Radio	88-108	2.1
High VHF TV	174-216	2.3
UHF TV	470-806	2.0

APPROACH USED TO DETERMINE POPULATION EXPOSURE

The method used for our assessment of population exposure incorporates (a) identification of sites representative of the population distribution in a given metropolitan area, (b) measurement of the ambient field intensities existing at these representative sites, and (c) subsequent use of a model, to estimate the exposure that would have been measured at many other locations throughout the city. The results of this modeling phase are then analyzed to determine the fraction of the population potentially exposed to different intensities of RF and MW radiation.

An important, underlying factor in our approach is the availability of detailed census data for the entire US suitable for machine processing. These census data, based on the 1970 census of the US, represent the number of persons residing in specific geographical cells called Census Enumeration Districts (CEDs) and the geographical coordinates of the centroid of each CED. A CED is a relatively small geographic area, consisting of, for example, a few city blocks within densely populated areas such as cities, but may be larger in rural regions wherein the population is more sparsely distributed. The entire US population is contained within some 257,000 such CEDs.

We have developed a method for selecting environmental measurement sites which are representative of the population within a city. First, general boundaries are defined for a city which include essentially all of the metropolitan area population and all corresponding CEDs within these boundaries are then selected for subsequent processing from the overall census data base. In effect, each of these CEDs is assigned a weighting factor, according to the population within each CED. We then use

a random process to select any desired number of these CEDs to use as measurement sites. Thus, we use a technique which incorporates an equal likelihood of choosing any particular CED, except that those CEDs having a greater population are weighted in such a way as to increase their chance of being selected as a measurement site. Out of this process, we obtain those sites which are deemed to be most representative of the total city population. Field measurements are then accomplished at each of the selected sites, usually between 30 and 40, from which subsequent propagation models are generated. In addition to these sites, selected irrespective of RF and MW source locations, a few measurement sites are also included very near to selected transmitters to ensure a comprehensive approach to defining the full range of environmental levels.

Field measurements are then performed at each selected site using the aforementioned mobile measurement van. This field activity is normally accomplished during an intensive two-week period of time. The actual measurement process is performed by situating the measurement van at a specific stationary location. No attempt is routinely made to evaluate standing wave phenomena in the vicinity of each measurement site and thus seek out either maximum or minimum field intensities which are characteristically present in such measurements. The extent to which such immediate location variability affects the resulting measurements is reflected in the scatter of the final data and is inherent in the variance with which we subsequently predict field intensities via a model.

The results presented in this report are the product of USEPA field measurements conducted in 12 US cities which include in the order that they were studied Boston, Atlanta, Miami, Philadelphia, New York, Chicago, Washington, Las Vegas, San Diego, Portland, Houston, and Los Angeles. The total population studied in these 12 cities is 38,144,845 and includes 38,548